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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/686,480	10/16/2003	Katsunori Nishimura	520.43216X00	8057

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EXAMINER

CHUO, TONY SHENG HSIANG

ART UNIT	PAPER NUMBER
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1746

DATE MAILED: 03/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/686,480

Applicant(s)

NISHIMURA ET AL.

Examiner

Tony Chuo

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-13, 16 and 17 is/are rejected.
- 7) ☒ Claim(s) 14 and 15 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 October 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 10/16/03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters "203" and "206" have both been used to designate a holder. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

2. The abstract of the disclosure is objected to because in line 10, the phrase "oxidizing gas" should be changed to "fuel gas". Correction is required. See MPEP § 608.01(b).
3. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.
4. The disclosure is objected to because of the following informalities: on page 12, line 23, "612" should be changed to "615" and Fig. 2 should be changed to Fig. 6. Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1, 12 and 17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Regarding claim 1, it is unclear why oxidizing gas is fed to the anode. Regarding claim 12, it is unclear whether the humidifier is located within the fuel cell assembly or outside of the fuel cell assembly and also whether the oxidizing gas is supplied to the anode. Regarding claim 17, it is unclear why the fuel gas is fed to the anode and the cathode.
7. Claims 3 and 4 recite the limitation "said porous material" in fuel cell assembly. There is insufficient antecedent basis for this limitation in the claim.
8. Claim 12 recites the limitation "said humidifier" in fuel cell assembly. There is insufficient antecedent basis for this limitation in the claim.
9. Claim 17 recites the limitation "said water retaining member" in fuel cell assembly. There is insufficient antecedent basis for this limitation in the claim.
10. Claim 7 is rejected because of its improper use of the Markush group. The phrase "selected from the group of" should be changed to "selected from the group consisting of".

Claim Rejections - 35 USC § 102

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

12. Claims 1, 2, 4, 8, 10, and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Kawazu (JP 08-138704). The Kawazu reference teaches a fuel cell assembly "100" including at least one unit fuel cell "10" comprising a separator "14" having flow channels for oxidizing gas, a cathode "12" to which the oxidizing gas is fed, a membrane electrolyte "11", an anode "13" to which fuel gas is fed, and a separator "15" having flow channels for the fuel gas (See Drawing 2). The fuel cell assembly further comprises a humidifier "110" having a porous membrane "111" to humidify the fuel gas to be fed to anode where the porous membrane faces the flow channels for the fuel gas so that water is supplied to flow channels from the part of the surface of the porous membrane opposite to the water supplying face (See Drawing 3). It also teaches a porous membrane that is made of a hydrophilic polymer material (See paragraph [0037]). It also teaches a water permeable membrane having the function to transmit water that is formed on porous material (See Drawing 3). It also teaches a humidifier that has a porous carbon filter "608" (See Drawing 5 and paragraph [0062]). It also teaches a humidifier that is provided for a group of unit cells (See Drawing 1). It also teaches a power generation system "1" comprising a hydrogen gas storage tub and a fuel cell assembly "100" connected to the hydrogen gas storage tub with a piping

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through which fuel gas flows where the fuel cell assembly generates electricity using the fuel gas from the hydrogen gas storage tub (See Drawing 1 and paragraph [0044]).

13. Claims 12, 13, and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Karakane et al (JP 2000-173633). The Karakane reference teaches a fuel cell assembly that includes a unit cell "100" comprising a cathode "22", anode "23", membrane electrolyte "21", and a humidifier "40" that is equipped with a water retaining layer "402" (See Drawing 1 and paragraph [0014]). Further, it also teaches the water retaining layer that has a hydrophilic porous member (See Drawing 2 and paragraph [0025]). In addition, it teaches a water retaining layer which is provided to the flow channels "400" of the fuel gas and has one surface to supply water to flow channels where water is supplied from the outer edge of the water retaining layer (See Drawing 1).

Claim Rejections - 35 USC § 103

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15. Claims 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawazu (JP 08-138704) in view of Mossman (US 2001/0046616). The Kawazu reference is applied to claims 1, 2, 4, 8, 10, and 11 for reasons stated above. However, the reference does not expressly teach a water permeable membrane that has a mean pore diameter of 0.01 to 0.1 micrometer, a thickness of 10 to 100 micrometer, a porosity

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of 50-90%. It also does not expressly teach a membrane treated to be hydrophilic and selected from polytetrafluoroethylene, polystyrene and copolymer of styrene and butadiene. The Mossman reference does teach a water permeable membrane, Nafion, that is a polytetrafluoroethylene membrane treated to be hydrophilic and has an average pore size between 0.025 to 0.1 micrometer, a porosity of greater than 50%, and a thickness of 89 micrometer (See paragraph [0016] and Dupont Nafion PFSA Membranes Specs). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Kawazu fuel cell assembly to include a water permeable membrane that is a polytetrafluoroethylene membrane treated to be hydrophilic and has an average pore size between 0.025 to 0.1 micrometer, a porosity of greater than 50%, and a thickness of 89 micrometer because it is effective in adequately humidifying a reactant gas in a fuel cell.

16. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kawazu (JP 08-138704) in view of Kawazu (JP 08-138705). The Kawazu reference is applied to claims 1, 2, 4, 8, 10, and 11 for reasons stated above. However, the reference does not expressly teach a porous member that has a hydrogen oxidizing catalyst dispersed therein. The Kawazu(2) reference does teach a hydrogen oxidizing catalyst "22" that is dispersed on the porous film "21" (See Abstract). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Kawazu fuel cell assembly to include a hydrogen oxidizing catalyst that is dispersed on the porous water permeable membrane so that a drop in the power generating

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capability of the fuel cell can be prevented by stopping the hydrogen gas from passing through the porous membrane.

17. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Karakane et al (JP 2000-173633) in view of Kawazu (JP 08-138704). The Karakane reference is applied to claims 12, 13, and 17 for reasons stated above. However, the reference does not expressly teach a water retaining layer that has a porous member which is provided opposite to the unit cell and has a water supplying surface where water is supplied from part of the surface opposite to the water supplying surface of the porous member. The Kawazu reference does teach a porous membrane that is provided opposite to the unit cell and has a water supplying surface (See Drawing 3). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Karakane fuel cell to include a porous membrane that is provided opposite to the unit cell and has a water supplying surface where the water is supplied from part of a surface opposite to the water supplying surface of the porous membrane in order to prevent water droplets and produce a good steam condition.

Allowable Subject Matter

Claims 14 and 15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The Karakane reference teaches a fuel cell assembly with a humidifier equipped with a water retaining layer, but it does not expressly teach a water retaining layer that has a mean pore diameter of 10

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to 300 micrometers or a water retaining layer that is a polypropylene non-woven cloth or a polyethylene-polypropylene non-woven cloth that is made hydrophilic.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tony Chuo whose telephone number is (571) 272-0717. The examiner can normally be reached on M-F, 8:30AM to 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr can be reached on (571) 272-1414. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TC 3/8/06

**MICHAEL BARR
SUPERVISORY PATENT EXAMINER**

